CLAIMS:

1. Trench isolation structure, comprising a slab of semiconducting material having a surface and a buried layer which extends parallel to the surface, and a trench groove which extends at least from the surface through the buried layer down to a part of the slab below the buried layer and which comprises a first insulating material having a thickness on a wall of the trench groove, and wherein a remaining part of the trench groove is at least partially filled with a first filler material, characterized in that at least in a first part of the trench groove which is surrounded by the buried layer, the thickness is larger than the thickness in a second part of the trench groove which is located below the first part.

2. Trench isolation structure according to claim 1, characterized in that the thickness in the first part is larger than the thickness in a third part of the trench groove which is located above the first part.

3. Trench isolation structure according to any of the preceding claims, characterized in that the first part is completely filled with the first insulating material.

4. Trench isolation structure according to claim 3, characterized in that the first part extends substantially in line with the buried layer.

5. Semiconductor assembly, comprising a trench isolation structure according to any of claims 1-4, and at least one semiconductor device present on the surface of the slab of semiconducting material, wherein the semiconductor device is insulated by means of the trench isolation structure.

6. Method for forming a trench isolation in a semiconductor slab, comprising the steps of:
- providing a slab of semiconducting material, having a first surface and comprising a buried layer parallel to and below the first surface;

- forming a trench groove in the semiconductor slab, the trench groove having a bottom surface and a sidewall, and extending from the first surface through the buried layer and into the slab of semiconducting material;
- filling the trench groove at least with a first insulating material and with a first filler material, wherein the first insulating material covers at least the bottom surface and the sidewall in a layer having a thickness d, and wherein the first filler material at least partially fills a remaining part of the trench groove,

characterized in that at least in a first part of the trench groove which is surrounded by the buried layer, the thickness is larger than the thickness in a second part of the trench groove which is located below the first part.

7. Method according to claim 6, characterized in that the thickness in the first part of the trench groove is made larger than the thickness in a third part of the trench groove which is located above the first part.

8. Method according to any of claims 6-7, characterized in that the step of filling the trench groove comprises the steps of:
- covering the bottom surface and the sidewalls of the trench groove with a layer of first insulating material;
- filling the trench groove with a first filler material at least to a lower surface level of the buried layer;
- removing the first filler material down to a level which is substantially flush with the lower surface level of the buried layer; and
- filling the remaining part of the trench groove at least partially with a second insulating material.

9. Method according to claim 8, characterized in that the step of filling the remaining part with the second insulating material is followed by the steps of removing the second insulating material down to a level which is substantially flush with an upper surface level of the buried layer, and filling the remaining part of the trench groove with a second filler material.

10. Method according to any of claims 8-9, characterized in that the step of removing the first filler material and/or of the second insulating material comprises etching the material.